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Observations of Occultations of Stars by the Moon, and of Phenomena of Jupiter's Satellites, made at the Radcliffe Observatory, Oxford, 1882–83.

(*Communicated by E. J. Stone, M.A., F.R.S.*)

Occultations of Stars by the Moon.

Ref.	Day of Observation.	Phenomenon.	Moon's Limb.	Instrument.	Power.	G.M.T. of Observation. h m s	Obs.
(*a*)	1882, Mar. 22	Disapp. 53 Arietis	Dark	42-inch telescope	80	10 10 43·6	R.
(*b*)	Apr. 1	Disapp. *e* Leonis	Bright	10-foot Equatorial	160	11 33 17·3	R.
(*c*)	May 29	Disapp. B.A.C. 4700	Dark	,,	160	13 1 27·1	R.
(*d*)	June 7	Reapp. κ Aquarii	,,	42-inch telescope	80	12 20 4·8	R.
(*e*)	Aug. 2	Reapp. 22 Piscium	,,	10-foot Equatorial	160	10 50 7·5	F.B.
(*f*)	Sept. 20	Disapp. μ Sagittarii	,,	,,	125	9 17 24·7	F.B.
	Oct. 24	Disapp. 51 Piscium	,,	,,	125	11 49 49·5	F.B.
(*g*)	1883, Feb. 15	Disapp. B.A.C. 1563	,,	Heliometer	200	10 2 22·3	W.
(*h*)		,,	,,	10-foot Equatorial	160	10 2 22·2	R.
(*i*)	16	Disapp. χ^2 Orionis	,,	Heliometer	200	5 58 45·8	W.
		,,	,,	10-foot Equatorial	160	5 58 45·8	R.
(*k*)		,,	,,	42-inch telescope	80	5 58 45·5	F.B.
(*l*)	Mar. 12	Disapp. *o* Arietis	,,	Heliometer	80	6 49 35·1	W.
(*m*)		,,	,,	10-foot Equatorial	160	6 49 35·3	R.
(*n*)		,,	,,	42-inch telescope	80	6 49 34·8	F.B.

Remarks.

(*a*) and (*d*) Star exceedingly faint; observation difficult; Moon very low. (*b*) Lost in glare at Moon's limb.

(*c*) Disappeared instantaneously; observation considered very good. (*e*) The time noted may be a very little late.

(*f*), (*g*), (*h*), and (*i*) Instantaneous. (*k*) and (*m*) Instantaneous; but chronometer beats faint, noise from bells, &c.

(*l*) Disappearance instantaneous. Images very steady. "Earth-shine" very distinctly showed markings on the Moon; the star appeared to touch the "Earth-shine" limb at least two seconds before its sudden disappearance.

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In converting Oxford Mean Solar Times into Greenwich Mean Solar Times the following Longitude has been used, $5^{m}\ 2^{s}{\cdot}6$ W.

Phenomena of Jupiter's Satellites.

Ref.	Day of Observation.	Satellite.	Phenomenon.	Instrument.	Power.	G.M.T. of Observation.	G.M.T. of N.A.	Obs.
						h m s	h m s	
	1882, Jan. 7	II.	Oc. D. Bisection	10 foot Equatorial	160	7 33 26	7 32 0	W.
	7	III.	Tr. E. Bisection	,,	,,	8 23 39	8 26 0	W.
			Last contact	,,	,,	8 32 58		
		I.	Tr. I. Ext. contact	,,	,,	8 27 9	8 27 0	W.
			Bisection	,,	,,	8 29 23		
			Int. contact	,,	,,	8 32 4		
	7	I.	Tr. E. Int. contact	,,	,,	10 35 45	10 40 0	W.
			Bisection	,,	,,	10 39 31		
			Ext. contact	,,	,,	10 41 59		
	23	I.	Tr. I. Ext. contact	,,	,,	6 38 11	6 39 0	R.
			Bisection	,,	,,	6 42 26		
			Int. contact	,,	,,	6 46 10		
	23	II.	Tr. I. Bisection	,,	,,	7 13 36	7 16 0	R.
			Int. contact	,,	,,	7 17 45		
(*a*)	24	I.	Ec. R. First seen	,,	,,	7 23 17	7 23 33	W.
(*b*)	Feb. 1	III.	Oc. D. Bisection	42-inch telescope	80	7 43 10 ±	7 45 0	R.
			Last contact	,,	,,	7 48 24		

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Ref.	Day of Observation.	Satellite.	Phenomenon.	Instrument.	Power.	G.M.T. of Observation. h m s	G.M.T. of N.A. h m s	Obs.
	1882, Feb. 1	II.	Ec. R. First seen	42-inch telescope	80	9 30 9	9 30 2	R.
			Half brightness	,,	,,	9 31 22	—	,,
			Full brightness	,,	,,	9 33 22	—	,,
	1	III.	Oc. R. First contact	,,	,,	9 38 51	9 49 0	R.
			Bisection	,,	,,	9 43 20		
			Last contact	,,	,,	9 46 50		
	15	I.	Tr. I. First contact	,,	,,	6 50 45	6 52 0	R.
			Bisection	,,	,,	6 55 25		
			Last contact	,,	,,	7 2 48		
	24	II.	Tr. I. Ext. contact	10-foot Equatorial	160	7 8 16	7 11 0	R.
			Bisection	,,	,,	7 11 16		
			Int. contact	,,	,,	7 14 45		
	Mar. 3	I.	Tr. E. Int. contact	,,	,,	7 27 9	7 30 0	R.
			Bisection	,,	,,	7 29 23		
			Ext. contact	,,	,,	7 32 38		
	Apr. 3	III.	Tr. I. Ext. contact	Heliometer	200	7 41 57	7 45 0	R.
			Bisection	,,	,,	7 49 25		
			Int. contact	,,	,,	7 58 4		
	3	I.	Ec. R. First seen	,,	,,	8 12 29	8 12 18	R.
			Full brightness	,,	,,	8 15 30±	...	,,

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Ref.	Day of Observation.	Satellite.	Phenomenon.	Instrument.	Power.	G.M.T. of Observation.	G.M.T. of N.A.	Obs.
						h m s	h m s	
(*c*)	1882, Apr. 6	II.	Ec. R. First seen	Heliometer	200	8 57 54	8 57 40	W.
			Half brightness	,,	,,	8 59 23	—	,,
			Full brightness	,,	,,	9 1 2	—	,,
	6	II.	Ec. R. First seen	10-foot Equatorial	160	8 57 36	8 57 40	R.
			Half brightness	,,	,,	8 59 11	—	,,
			Full brightness	,,	,,	9 0 41	—	,,
	1883, Jan. 26	II.	Ec. R. First seen	,,	125	9 16 22	9 16 37	R.
			Full brightness	,,	,,	9 20 12	—	,,
	26	I.	Tr. I. Ext. contact	,,	,,	10 17 17		
			Bisection	,,	,,	10 20 32	10 21 0	R.
			Internal contact	,,	,,	10 24 1		
	27	I.	Ec. R. First seen	,,	160	10 39 11	10 39 33	F.B.
			Full brightness	,,	,,	10 41 31	—	,,
	Feb. 5	I.	Ec. R. First seen	,,	,,	7 3 57	7 4 5	R.
			Full brightness	,,	,,	7 7 27 ±	—	,,
(*d*)	5	III.	Tr. I. Ext. contact	,,	,,	10 49 40		
			Bisection	,,	,,	10 57 19	10 58 0	R.
			Int. contact	,,	,,	11 8 42		

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Ref.	Day of Observation.	Satellite.	Phenomenon.	Instrument.	Power.	G.M.T. of Observation.	G.M.T. of N.A.	Obs.
						h m s	h m s	
(*e*)	1883, Feb. 5	III.	Tr. I. Ext. contact	Heliometer	200	10 53 47	10 58 0	F.B.
			Bisection	,,	,,	10 59 31		
			Int. contact	,,	,,	11 6 30		
(*f*)	9	III.	Ec. R. First seen	,,	,,	7 49 49	7 52 23	W.
			Half brightness	,,	,,	7 55 8	—	,,
			Full brightness	,,	,,	8 1 7	—	,,
	9	III.	Ec. R. First seen	10-foot Equatorial	160	7 49 45	7 52 23	R.
			Full brightness	,,	,,	8 0 9±	—	,,
	10	I.	Oc. D. Ext. contact	,,	,,	11 4 25	11 9 0	F.B.
			Bisection	,,	,,	11 7 54±		
			Last contact	,,	,,	11 9 54		
	12	I.	Ec. R. First seen	,,	,,	8 59 30	8 59 45	R.
			Full brightness	,,	,,	9 2 4±	—	,,
	12	I.	Ec. R. First seen	Heliometer	200	8 59 33	8 59 45	F.B.
	16	III.	Oc. R. Last contact	,,	,,	7 0 35	7 3 0	W.
	16	III.	Oc. R. Bisection	10-foot Equatorial	125	7 0 20	7 3 0	R.
			Last contact	,,	,,	7 3 4		
(*g*)	16	III.	Ec. D. Decided diminution	,,	,,	9 8 14	—	R.
			Last seen	,,	,,	9 15 18	9 13 20	,,

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Ref.	Day of Observation.	Satellite.	Phenomenon.	Instrument.	Power.	G.M.T. of Observation.	G.M.T. of N.A.	Obs.
						h m s	h m s	
	1883, Feb. 16	III.	Ec. D. Last seen	Heliometer	200	9 15 34	9 13 20	F.B.
(*h*)	16	III.	Ec. R. First seen	,,	200	11 51 59	11 54 13	W.
			Half brightness	,,	80	11 57 1	—	,,
			Full brightness	,,	80	12 1 45	--	,,
	16	III.	Ec. R. First seen	10-foot Equatorial	160	11 51 51	11 54 13	R.
			Full brightness	,,	,,	11 59 0±	—	,,
(*i*)	16	II.	Oc. D. Bisection	Heliometer	80	11 58 16	11 58 0	W.
			Last contact	,,	,,	12 0 15		
	16	II.	Oc. D. Bisection	10-foot Equatorial	160	11 56 1	11 58 0	R.
			Last contact	,,	,,	11 59 40		
(*k*)	19	I.	Oc. D. First contact	,,	,,	7 24 8	7 28 0	R.
			Last contact	,,	,,	7 29 32		
	23	III.	Oc. D. First contact	,,	,,	8 3 29	8 8 0	F.B.
			Bisection	,,	,,	8 7 28		
			Last contact	,,	,,	8 10 13		
	23	III.	Oc. R. First seen	,,	,,	10 45 2	10 52 0	R.
			Bisection	,,	,,	10 48 32		
			Ext. contact	,,	,,	10 51 31		
	23	III.	Ec. D. Last seen	,,	,,	13 15 52	13 14 14	R.

Ref.	Day of Observation.	Satellite.	Phenomenon.	Instrument.	Power.	G.M.T. of Observation.	G.M.T. of N.A.	Obs.
						h m s	h m s	
	1883, Feb. 26	I.	Oc. D. First contact	10-foot Equatorial	160	9 16 4		
			Bisection	,,	,,	9 18 54	9 21 0	R.
			Last contact	,,	,,	9 21 53		
	26	I.	Oc. D. First contact	Heliometer	200	9 19 6		
			Bisection	,,	,,	9 21 6	9 21 0	F.B.
			Last contact	,,	,,	9 22 20		
	Mar. 15	I.	Tr. E. Int. contact	10-foot Equatorial	160	7 4 49		
			Bisection	,,	,,	7 7 58	7 9 0	W.
			Ext. contact	,,	,,	7 10 18		
	30	I.	Ec. R. First seen	Heliometer	200	9 32 17	9 32 20	F.B.
	30	I.	Ec. R. First seen	10-foot Equatorial	160	9 32 11	9 32 20	R.
(*l*)	31	II.	Ec. R. First seen	Heliometer	200	8 35 28	8 35 14	W.
			Half brightness	,,	,,	8 38 8	—	,,
			Full brightness	,,	,,	8 40 28	—	,,
	31	II.	Ec. R. First seen	10-foot Equatorial	160	8 35 34	8 35 14	F.B.
(*m*)	31	III.	Ec. D. Brightness had dimin.	Heliometer	200	9 9 53	—	W.
			Half brightness	,,	,,	9 13 53	—	,,
			Last seen	,,	,,	9 18 25	9 16 41	,,
	31	III.	Ec. D. Last seen	10-foot Equatorial	160	9 18 48	9 16 41	F.B.

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Ref.	Day of Observation.	Satellite.	Phenomenon.	Instrument.	Power.	G.M.T. of Observation.	G.M.T. of N.A.	Obs.
						h m s	h m s	
(*n*)	1883, Apr. 4	IV.	Ec. D. Had faded	10-foot Equatorial	160	9 13 21	—	R.
			Last seen	,,	,,	10 1 28	9 33 54	,,
(*o*)	4	IV.	Ec. D. Last seen	Heliometer	160	10 14 52	9 33 54	F.B.
(*p*)	4	IV.	Ec. R. First seen	,,	,,	10 20 51	10 59 48	F.B.
	6	I.	Oc. D. First contact	10-foot Equatorial	160	7 56 9	8 0 0	R.
			Last contact	,,	,,	8 1 38		
	6	I.	Oc. D. First contact	Heliometer	,,	7 56 35	8 0 0	F.B.
			Last contact	,,	,,	8 0 49		
(*q*)	6	I.	Ec. R. First seen	10-foot Equatorial	,,	11 28 7	11 28 3	R.
	7	III.	Oc. D. First contact	,,	,,	8 14 14	8 20 0	F.B.
			Bisection	,,	,,	8 16 58		
			Last contact	,,	,,	8 20 13		
(*r*)	7	III.	Oc. R. First contact	,,	,,	11 6 41	11 11 0	W.
			Last contact	,,	,,	11 12 40		
	7	III.	Oc. R. First contact	Heliometer	,,	11 8 36	11 11 0	F.B.
			Ext. contact	,,	,,	11 13 20		
	7	II.	Ec. R. First seen	10-foot Equatorial	,,	11 11 13	11 10 38	W.
			Half brightness	,,	,,	11 13 25	—	,,
			Full brightness	,,	,,	11 15 9	—	,,
	7	II.	Ec. R. First seen	Heliometer	,,	11 11 24	11 10 38	F.B.

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Ref.	Day of Observation.	Satellite.	Phenomenon.	Instrument.	Power.	G.M.T. of Observation.	G.M.T. of N.A.	Obs.
						h m s	h m s	
(s)	1883, Apr. 14	II.	Oc. D. First contact	10-foot Equatorial	125	8 38 25	8 44 0	F.B.
			Last contact	”	”	8 44 54		
	25	III.	Tr. E. Int. contact	”	”	9 53 13	9 56 0	F.B.
			Bisection	”	”	9 56 12		
			Ext. contact	”	”	10 0 42		

Remarks.

(*a*) Bad definition at times, but observation fair. (*b*) Jupiter's limb diffused.
(*c*) Jupiter boiling. Time of first appearance caught as the faintest trace. (*d*) Observation difficult.
(*e*) Images diffused at times. Internal contact fair.
(*f*) Slightly hazy at times, but not sufficient to interfere perceptibly with observations. (*g*) Moonlight, and sky very slightly hazy.
(*h*) Hazy, but faintest trace detected at the time 'First seen.' (*i*) Images bad. Observations unsatisfactory.
(*k*) Observations approximate. (*l*) Images diffused. (*m*) Images better than before.

(*n*) The time $10^h\ 1^m\ 28^s$ G.M.T. was when the satellite was *certainly* last seen by me; but I believe this to be early, as I thought I saw it again several times afterwards, and extending over three or four minutes of time. Observed with Jupiter *in* the field of view (R.)

(*o*) At $9^h\ 58^m$ G.M.T. the satellite had disappeared, when Jupiter was in the field; I continued to watch near the place, and happened to look in when Jupiter was just disappearing from the field, and then caught sight of the satellite, which was still shining distinctly. Gazed until $10^h\ 15^m\ 52^s$, when all trace of it had entirely disappeared. At $10^h\ 13^m\ 52^s$ it was only just visible. The time noted for disappearance is considered good (F.B.) The satellite (J. IV.) must have been about $1^h\ 15^m$ entering the shadow of Jupiter.

(*p*) After having entered the times and notes, &c., in observing book, I went to telescope again, and then saw a very faint trace of the satellite—this was at $11^h\ 20^m\ 51^s$ G.M.T.—but it was certainly brighter than when last seen at disappearance; I consider the time noted "First seen" is not more than two minutes late (F.B.)

(*q*) Images very bad. (*r*) Limbs diffused and tremulous. (*s*) Sky very hazy.

Observers.—W. = Mr. Wickham. R. = Mr. Robinson. F.B. = Mr. Frank Bellamy.

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Phenomena of Jupiter's Satellites observed at Mr. E. Crossley's Observatory, Bermerside, Halifax, during the Opposition 1882–3.
By J. Gledhill.

Date.	Phenomena.	G.M.T.			Time in *N. Almanac.*			Remarks.
		h	m	s	h	m	s	
1882. Nov. 11	I. Tr. I. First contact	9	38	0	9	37	0	Definition poor to-night.
	Inner contact		42	0				
	I. Sh. E. Just off	10	57	0	11	0	0	
	I. Tr. E. Inner contact	11	49	0	11	52	0	
	Outer contact		52	0				
14	II. Tr. I. First contact	11	8	0	11	9	0	Much tremulous motion.
	Inner contact		11	0				
	II. Sh. E. Inner contact	12	15	0	12	15	0	
	Just off		18	0				
27	I. Sh. E. Just off?	9	18	0	9	17	0	Very bad definition.
	I. Tr. E. Inner contact	9	46	0	9	48	0	
	Outer contact		48	0				
1883. Jan. 20	I. Ec. R. First seen	8	43	45	8	44	5	Good observation.
29	III. Tr. I. First contact	7	23	0	7	25	0	
	Bisection		29	0				
	Inner contact		32	0				
Feb. 4	I. Tr. E. Inner contact	8	47	0	8	51	0	
	Bisection		50	0				
	Just off		52	0				
11	I. Tr. E. Just off	10	41	0	10	41	0	Clouds interrupted the observations.
12	I. Ec. R. First seen	8	59	28	8	59	45	
27	*II. Ec. R. First seen	8	55	54	8	56	0	Fairly good observations.
	* Full orb	8	58	0				
Mar. 14	I. Ec. R. First seen	11	11	43	11	11	46	
	Full orb		15	0				
23	I. Ec. R. First seen	7	36	25	7	36	34	
	Full orb		40	0				
31	I. Sh. E. First contact	6	42	0	6	47	0	
	Bisection		44	0				
	Just off		46	0				

* Mr. Crossley was at the telescope during the observations thus marked.